CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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(3)

INTER-OFFICE CORRESPONDENCE

To: Mr. R. A. Young

Date: December 2, 1964

From: Mr. R. E. Calhoun

Copy for:

RECEIVED
EXECUTIVE DEPARTMENT
DEC 21 1964
AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

RECEIVED
DEC 3 1964
EXECUTIVE VICE PRESIDENT

Dear Dick:

Attached is a copy of Harrison Schmitt's report on our Aravaipa property in Graham County, Arizona.

Yours very truly,

R. E. Calhoun

REC/h

HARRISON A. SCHMITT
CONSULTING MINING GEOLOGIST
COTTAGE SANATORIUM ROAD
SILVER CITY, NEW MEXICO

PHONE
AREA 505
LOCAL 538-5818

November 13, 1964

American Zinc, Lead, and Smelting Co.
1023 Hamilton Bank Building
Knoxville, Tennessee

Attention: M. E. Calhoun, Manager

Aravaipa Property, Klondike Arizona
Zn, Pb, Ag, Au.

Your Aravaipa property and mines lies in T5S, R19E, Graham County, Arizona. It is 55 miles by road to Safford, Arizona, and about 50 miles to a Southern Pacific RR siding west of Safford. Your mill is in the Aravaipa Valley about 6 miles southwest of the mines.

The mines may have produced about 300,000 tons of lead-zinc ore that average about 10% Zn and 5% Pb. A small amount of Ag and Au is recovered. The chief mines are the Iron Cap, Head Center and Grand Central. The records available of past production and grade available to me are incomplete, but probably can be supplemented by data in the offices at the mine and mill. The Head Center has produced the best grade of ore (and the most tonnage?).

The mines operated from 1948 (?) to 1957. The mine and mill equipment is in place and in fair shape especially that at the mines. I have a more or less complete list of the equipment at the mines and mill in my notes and these are, of course, available to the company.

The available geologic and engineering data include:

(1) An excellent geologic and engineering report with detailed maps by J. W. Reinhart dated November, 1952.

(2) Ross, C. P."Geology and Ore Deposits of the Aravaipa and Stanley Mining District, Graham County, Arizona." U. S. Geol. Survey, Bul. 225, 1925.

(3) U. S. Bureau of Mines, R.I.4007, Aravaipa Lead-Zinc deposits, Graham County, Arizona, 1947.

(4) Mine maps, field notes and reports by Harrison A. Schmitt. In files at Silver City, New Mexico. Some duplicates may be in the office at the mine.

The question at this time is: do the factors of the present metal market, possibilities for the continuation of this market, present and prospective mining costs and the possibilities for new ore on the property--its magnitude and grade--justify a program of exploration and what are the probable costs of such a program? In this report will be discussed only the geological factors bearing on exploration and development. Suggestions for procedure in development will be made.

From a geological point of view the possibilities for new "ore" bodies appear to be good. This accessment is based on (1) the fairly good results obtained in the past with limited exploration and development, (2) the presence of numerous intersecting structural forms largely faults but including anticlinal bends such as have localized the known ore bodies. Some of these structural forms are associated with ore type mineralizations including silicates, silicification, garnet, manganese oxide and iron oxides. Some outcrops contain

lead and zinc in the sulphide and oxidized state, (3) the large blocks of unexplored limestone and rhyolite. Walls of these rocks were favorable for ore deposition.

In general, besides the wall rock influence the ore localization appears to be controlled by the intersection of east-west with N20W faults especially where the disturbance in the ground associated with the intersections results in plunging anticlinal structures. In the Head Center-Iron Cap zone the east-west structure is a thrust fault zone with a large component of strike skip. There is suggestive evidence that this movement was left-lateral, that is, that the north wall moved westward.

Because the most productive mines have been on or near the east-west over-thrust fault that crosses the area on the north this "structure" would seem to be the most favorable for the first exploration work. At the Iron Cap Mine the west drift on the adit level has not been extended more than 40 ft. west beyond the main ore shoot. The heading is in an east-west fault-vein zone 40 ft. wide. At the Head Center the east drift on the adit level has not been extended more than about 50 ft. eastward beyond the ore shoot. Normal exploration practice would have been to extend these "main" headings along the ore localizing fault for at least several hundred feet more. The ore shoots, in other words, are localized in this fault-vein.

The distance between these two adit headings is about 2000 ft. There may be 100 ft. or so difference in elevation. There appear to be at least six fault intersections between the two mines. Only

one of these, a few hundred feet west of the Iron Cap open pit, has been mapped as having associated silicate (gangue) mineralization. Along the east-west fault a second area of silication is indicated on the Reinhart map about half-way between the two mines. This may be at an intersection.

When Reinhart's map is studied, many areas not all on company ground of apparent interest may be noted. These are possibilities at fault intersections with outcrops of associated silicates, manganese and some metallic mineralizations.

Conclusions

It appears to me that there is a good chance that further development on your ground may result in the development of at least an additional 500,000 tons of say 10% Zn and 5% Pb ore contained in sulphides.

If such a tonnage and such a grade is now of interest at Aravaipa, exploration and development work can be started with preliminary expenditures for repairs and clean-up that would not exceed $25,000. A first major stage in this work could, if completed, cost $250,000. This would include:

Preliminary rehabilitation, new drills, etc.	$ 25,000
Drifting and cross-cutting 3000 ft. @ $40	120,000
Diamond drilling 8000 ft. @ $6	48,000
1 year of supervision, engineering, geology	30,000
	$223,000
Contingencies	27,000
	$250,000

Reinhart in his report is not enthusiastic about the district. Conditions, however, are now favorable for the exploitation of formerly marginal deposits of the base metals and silver. Furthermore, the target of 500,000 tons of new ore if realized would permit the building of a mill of say 400 tons capacity on the property. This would result in lower costs.

Procedure

It would take about 30 days to rehabilitate the equipment and clean out the adits. Driving can start from each end. The elevations of the adits are not to be expected to match but this may be a good thing since eventually, then, there could be two mining levels.

During this preliminary work survey traverses would be run from adit to adit and detailed geologic work done with these as a base. Later additional detailed geological work would be pursued in neighboring areas and some short hole diamond drilling carried out in these same areas. Presumably geochemical work would be done so as to define targets in the altered areas and other places.

An alternative plan would be to do most of the preliminary work by diamond drilling largely from the surface. A minor part could be done from the ends of the Iron Cap and Head Center adits. This approach would have the advantage of requiring less early expenditure, but would increase the risk of missing ore between the mines. This alternative too would be slower, for a more intense surface geological survey would be needed to more closely define the targets for diamond drilling.

The company may not feel under compulsion to get an operation such as is possible at Aravaipa under early production and, therefore, would prefer the second approach. This would, at first, require an engineer and geologist on the ground mainly for surface detailed mapping and claim location and evaluation. A study of the district property situations any and some neighboring property should probably be optioned before any serious activity is undertaken.

The claims between the Head Center and Iron Cap mines should be modified so that they cover the apex and walls of the thrust fault zone. This zone in a sense is a fault-vein and the ore shoots along it would fall under apex law.

The adit drifting if undertaken should cut anticipated new ore shoots and define them in a preliminary way. Then underground drilling from cross-cuts could define the ore in more detail. In some areas with different conditions some short holes from the surface could be effective as in the Landaman area where there could be low grade open pit ore.

[illegible]
[illegible] SCHMITZ

ATHLETIC MINING & SMELTING GRAHAM COUNTY

& ARAVAIPA MINING DISTRICT

SEE: ABM - MICROFILM - ARAVAIPA AREA - (Aravapai Dist. - 2 maps)
ARAVAIPA MINING CO. - Plats of Aravapai Area - Geologic sketches-2 map
ARIZONA - 2 maps - map of claims - Geology
CONSOLIDATED GOLD MINING CO. - Galiuro Mtns. Mining claims
ATHLETIC MINING CO. - Head Center Mine - Plat - Geology - plat sample
plan of tonnage - 4 maps
Head Center Mine - Aravaipa Dist (2nd)
300 Level
Head Center & Iron Cap - Tunnels
IRON CAP - 2 maps - workings 7 geology - Aravaipa Dist.
Assays 1942
2 maps - Section holes 2,19,21,26
4 maps - Sections 1,9,10,11,13,14,17
5 maps - Sections 4,5,9,19-26, 459 area, SW portion
2 maps - Aravaipa Area - plat map & underground
3 maps - Aravaipa Dist. - Plates: D-8,3,2
PANAMA - Aravaipa Dist - 2 maps
&
HAVALINA - Havalina Tunnel - Plan map
ROYAL TINTO MINING & SMELTING CO - Survey #2438 - Aravaipa Dist.

ARIZONA GRAHAM COUNTY

(AKA: Unpatented Claims - Tule,
Patented Claims M S 1038, Aravaipi Mining Corp.) T4S,R19E,Sec.11

Graham County MILS 146B

USGS Cobre Grande Mtn. 7½' Quad (included in file)

USGS PP 461, p. 132, 1964 - Geology of the Klondyke Quad

AZBM - Bull 156 - AZ Zinc and Lead Deposits Part I, 1950, p. 60

ADMMR Grand Reef -file- (Hendrikson Report)

USBM RI 4007, p. 6, 1947, Aravaipa Lead Zinc Deposits, T. C. Denton

SEE: ABM - MICROFILM - Arizona - 2 maps; map of claims - 7 geology

PANAMA MINE

(AKA: Patented Claims M S 4012)

GRAHAM COUNTY
T5S,R19E,Sec.36

Graham County MILS #150B

USGS Cobre Grande Mtn. 7½' Quad (included in file)

USGS PP 461, p. 135, 1964, Geology of the Klondyke Quad

USBM RI 4007, 1947 - Aravaipa Lead-Zinc Deposits, T. C. Denton

SEE: ARAVAIPA Mining District (file)

STATE OF ARIZONA
DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX 7, ARIZONA

Tucson, Arizona,
Nov. 5, 1963

Assessor's office in Safford

MEMORANDUM

To: Frank P. Knight, Director

From: Axel L. Johnson, Field Engineer

Re: Sale of Athletic Mining Co. properties in the Aravaipa-Klondyke area.

The following information was obtained from Mrs. Claude McNair, Klondyke on Oct. 10, 1

The Athletic Mining Co. sold out all their properties in the Aravaipa-Klondyke area to American Zinc Co. The sale is reported to have been made about August 1, 1963. The sale includes the mines, Head Center, &Panama, and all the mining claims included with these; and also the mill and mine buildings.

American Zinc Co. has done no work on these properties sine the time of the purchase.

American Zinc Co. also owns a number of other claims on the Grand Reef on which they have been doing assessment work for a number of years.

Bought out in early 1980's

COPY

A GENERAL REPORT ON THE ARAVAIPA MINING DISTRICT OF SOUTHERN ARIZONA WITH SPECIAL REFERENCE TO THE PROPERTIES OF THE ARAVAIPA MINING CORP.

By H. Hendrickson (1928).

The Aravaipa Mining District is located in Western Graham County, about seventy miles northwest of Willcox, Arizona. Roughly, it comprises an area some ten miles long in the lower reaches of the western slope of the Santa Teresa Mountains.

Transportation Facilities.

The district lies about forty-five miles over a fair highway from the railroad at Cork, a siding on the Globe branch of the Southern Pacific. The lack of tansportation facilities has been the main drawback to date of the district. However, there are two feasible routes to the railroad, which will greatly shorten the distance which ores and supplies have to be hauled, and greatly facilitate transportation in general. One route calls for a road down Black Rock Canyon to Fort Thomas on the Globe branch of the Southern Pacific. The other calls for a road westerly from Aravaipa to Winkelman, or Christmas, near Hayden. Both of these routes call for some twenty-five miles of new highway construction about half of which will be heavy mountain work, and the other half will be over faily level ridges and mesas.

Geology.

The district lies in the foothills on the western slope of the Santa Teresa Mountains. The drainage is into the Aravaipa Canyon, and then into the San Pedro and Gila Rivers. The general trend of the ledges and ore bodies is from the southeast to the northwest. In the Grand Reef Mine, some four miles from Klondyke, which will be considered the southern end of the district, there is an immense silica-breccia ledge some hundred feet wide, and projecting several hundred feet into the air. This is apparently on the main fault, connected with the main uplift of the mountains to the east, probably representing a throw of several thousand feet. The hanging, or western wall of the immense ledge is of soft rhyolitic tuff. The foot wall is a greenish basic igneous rock which occupies a narrow area of two or three hundred feet in most places between the ledge and the main granite mass of the mountain. The ledge itself marks the eastern boundary of the sediments of the region in some places, but in many places the hanging wall country is in acidic igneous rock.

This big ledge can be traced for about five miles. It often disappears, or pinches down to a very narrow width, and then again swells and presents a bold outcrop. It traverses several big canyons between the Grand Reef and Aravaipa, and nearly everywhere shows small amounts of lead ore. The country traversed by this ledge is all igneous until Bullis Mountain, about a mile south of Aravaipa, is reached. Traversing Bullis Mountain, the ledge enters the carboniferous limestone of the region, and from this point north its general character changes.

On the properties of the Aravaipa Mining Corporation, the predominating country rock is the carbomiferous "tornado" limestone of the Globe-Miami district to the north, although there also are not inconsiderable areas of igneous materials traversed by the ore-bearing veins.

There seem to be three types of ore deposits on the Aravaipa property. First, there are immense areas of tremolite, or actinolite, which invariably carry lead and zinc ores.

Second, there are bodies in the limestone which appear to be true limestone replacement deposits, and are generally evidenced by siliceous outcrops in the limestone.

Third, there are several true fissure veins, both in the limestone and in the igneous material.

Generally speaking, the ores in the igneous rock carry better silver values than in the limestone.

To describe these various deposits in detail and give a fairly comprehensive description of the district, it is best to start with the Grand Reef property at the southern end of the areas. This property was originally owned by John Mackay, of Comstock fame, who held the thring for many years with the idea that he had a second Comstock. It is now owned by the Aravaipa Leasing Company, which in turn is controlled by the American Zinc Lead and Smelting Company.

To repeat, it is a big siliceous breccia fissure vein with a width, in places, upward of a hundred feet. The vein dips about seventy degrees to the west, and strikes northwest twenty degrees. The hanging wall is a soft rhyolitic tuff. The footwall which is not very well defined, is a greenish basic igneous rock which is of no great width between the vein and the main granite mass of the mountain.

Upwards of thirty-thousand tons of ore have been mined from the Grand Reef property, and there is considerable good ore left in the mine. It is developed by a tunnel which is a drift on the ledge some three hundred feet below the surface. This tunnel is one thousand five hundred feet long, and explores two ore shoots, and a long area of very low grade ore, which can hardly be considered ore under any conditions. A shaft has been sunk three hundred feet deep from this adit level, and several hundred feet of work have been done on the various levels. In the vicinity of this shaft, and above the tunnel, some thirty thousand tons of ore have been mined in an immmense open stope. The average grade of this ore was twelve percent lead, eleven ounces of silver, and one percent copper. There is no gold in the ore, concentrates seldom running even their required sixty cents gold in order to be paid for by the smelter. Above the tunnel level, and practically everywhere, the ore as seen in the Grand Reef ~~is~~ is zinc free, running less than one percent everywhere.

This ore extends below the tunnel to the hundred foot level, where it is both smaller in area and lower in lead content than in the tunnel above.

On the two hundred foot level, which is a hundred feet below the water level, a width of about five feet, and a length of about sixty feet, is exposed which will assay about five percent copper and twenty ounces of silver. The ore here is of an entirely different character than in the levels above, being a soft aluminous material, carrying sooty black chalcocite, and a few percent lead as galena, which is so intimately and finely mixed as to be with difficulty discerned.

On the three ~~thousand~~ hundred foot level, a wider and apparently larger area is exposed. It is more oxydized than in any other part of the mine, and shows five or six ounces of silver, with very few copper and lead minerals to be seen.

The natural conclusion here is that there is a possibility of a big copper-silver ore body being found at some depth. However, an abortive attempt at diamond drilling here proved a failure. This diamond drilling was done by the American Zinc Lead and Smelting Company. Reliable information is that they did not succeed in getting a hole down to the area of possibility.

There are several other exposures of workable ore on this Grand Reef ledge, notably the Dog-water, a half mile to the south, where there is an exposure of ore some two hundred feet long and a foot or two wide, the best of which will run some twenty percent lead and thirty ounces of silver. Generally speaking, the property is well worth investigation by anyone looking for lead ores.

The Bullis property is ~~one~~ on the same fault, or vein system, some four miles north of the Grand Reef, a mile south of the Aravaipa Post Office, and is also a true fissure ~~of~~ in igneous rock. It is very similar in structure to the Grand Reef Mine itself, except that in one place it traverses quite a block of limestone. This ledge has been cut by an adit tunnel some two hundred feet below the outcrop. It shows widths of ore up to and exceeding twenty feet in places. The one ore body mentioned has been estimated by various engineers to contain fifty thousand tons of ore which will assay about fifteen ounces of silver and two percent lead. It is an ore which would be very difficult to mill as a small amount of copper present precludes cyaniding, and the fact that a large part of the silver is present as chloride renders any concentration process difficult.

Properties of the Aravaipa Mining Corp.

Entering the limestone area to the north of Bullis, owned largely by the Aravaipa Mining Corporation, entirely different structural and geological conditions are encountered.

In place of a single big fissure there are many prominent fissures traversing the limestone, and other rocks with the same general strike and dip. In place of the ore being confined to this single fissure, it occurs in various places over an area with an east-west dimension of several miles. The various workings, a starting with the south end of the property, are described below.

On the Sand-Carbonate claim, which is a few hundred feet south of the mill and power plant, a big width of ore is indicated on the surface by the outcropping in the limestone of lead and zinc carbonates and calamine. While the width of the ore here exposed is evidently upward of one hundred feet, it is predominately low grade in lead and very zincy. In one place a small incline has been sunk about twenty feet, and it shows a foot or carbonate which will assay about sixteen percent lead and twenty-two percent zinc. The walls are largely zinc carbonate. Another small hole has been started on the out-cropping and shows a lot of zinc and lead carbonates of no special interest. However, there is here a big area of black tremolite which probably indicates a big lead-zinc ore body below. The mill excavation itself is largely in this black actinolite, or tremolite, and will assay considerable zinc.

On the Number Two claim, about two hundred feet west of the mill, is an open cut which shows a big body of lead-zinc carbonate and calamine. Surface indications here are that it is probably there a big tonnage of this stuff. Ore from this cut as mined to date has averaged above eight percent lead and twenty-two percent zinc with one dollar gold and an ounce of silver. However, there are several streaks of rather high grade lead carbonate exposed. This ore body has not been prospected at any depth. It may be big.

On Number One claim, in the canyon to the north of the mill, is the working know as the Number One. A considerable tonnage of lead-zinc carbonate has been mined here. On the hundred twenty-nine foot level an ore body has been developed which is about three hundred feet long and forty-feet wide. There is a streak on the foot wall, some fifteen feet in width, which will average about twelve percent lead and eighteen percent zinc, with spots of higher grade material at irregular intervals. The rest of the area is oxidized zinc ore, in places very high grade. To the east, the ore body degenerates into a bunch of apparently barren fissures; to the west our last work was still in ore with no walls apparent, but the lead content had dropped to about eight percent, and the zinc content had raised to about thirty-five percent. It may continue to the northwest for some distance where an incline was sunk for another hundred feet in the footwall of this ore body. The fissure was cut but the ore was never found. It is believed to have a very flat pitch to the northwest of the inter-section of two of these fissures, in the limestone, and for that reason was not encountered on the level below. The stopes in this ore body have caved to the surface, and, while the incline shaft in the hard footwall is surely in good shape, water from the creek has run into and filled the workings and they are not now accessible.

The Nina, some four hundred feet northeast of the Number One, is an exposure on the north-south fissure, some sixty feet long and five feet wide, of ore which will assay about fifteen percent lead and twenty percent zinc, as carbonate and silicate. Following this same break to the north, several small similar outcrops are encountered until some 5000 feet to the northwest the Arizona Shaft is reached. This showing merits considerable discussion and in itself may develop into a big mine.

At the Arizona, igneous material is again encountered. The ore deposits is manifested on the surface by a big prominent vein outcropping for some one thousand feet of length and generally running from five to ten feet wide. About a quarter mile south of the shaft the carboniferous limestone can be noted apparently covered by the igneous material. The igneous rock is here a basic porphyery with large white phenocrysts of feldspar. Where the vein intersects the contact between the porphyry and the limestone in an immense area of black tremolite carrying small amounts of lead and zinc materials. Returning to the Arizona Shaft about a quarter mile to the north; the ore here is in the big fissure mentioned before. An adit has been run into the vein and about a thousand feet of drifting has been done, For the greater part of this length the vein is soft, loose, oxidized material carrying small amounts of lead and zinc carbonates and an occasional strain of silver chloride. To the north the vein tightens up and is filled with hard quartz carrying a considerable amount of galena.

The shaft was started vertically in the outcrop and is about six hundred feet deep. The vein does not leave the shaft until the 300 foot level is reached at which point it starts diverging to the west. On the 400 foot level the vein lies about twenty-feet to the west of the shaft. From the surface to this level the vein carries a width of two to three feet of ore running about 13% lead, a little silver, and considerable zinc. On the 450 foot level the vein cannot be seen but a big area of red oxidized materials has been exposed by a considerable amount of drifting and crosscutting. On the 500 foot level the limestone appears and a big area of blocks of limestone, mixed with red Hematite and large amounts of tremolite can be seen. The water level generally stays about this level. Between the 500 and the 560, which is the bottom level, the shaft goes through a loose limestone and mud, consisting of oxidized gossan material and tremolite. The bottom of the shaft which is the 560 foot level is in good grade lead zinc ore. A small amount of drifting was done here and at the time of shutting down prospects were very favorable indeed. There is an ore body on this level about fifty feet wide and it has all the earmarks of being of great extent.

An attempt to drift south along the ore was frustrated by the drift caving in while being timbered. The face of the drift at the time it was abandoned assayed 22% lead and 22% zinc. The shaft should still be in good shape as it was retimbered from top to bottom. It is believed that this ore shaft will develop into a big mine.

Returning to the vicinity of the Number One Shaft, a break similar to the one just described and parallel to it at a distance of some six hundred feet to the east is encountered. Several large areas of zinc-lead are encountered along the fissure, and where last seen to the north is a big area of tremolite and ore on the surface. Zinc seems to predominate on the fissure. In one place there is an exposure which assays 40% zinc, and 6% lead. There is very probably an enormous tonnage of this material.

About two miles to the east of the main group of claims are two claims called the "Head Center" and the "Grand Central" which are contiguous on their ends.

A small fissure some five feet wide can be traced for the entire length of the two claims. Ore is shown everywhere and there is one large area which is very interesting. Two inclies have been sunk. In the one on the "Head Center" the ore is about five feet wide and in the sulphide which has just been reached assays 12% lead and 18% zinc, - 3.5 ounces of silver and $1.00 gold. This fissure also enters a big area of open caves and may make a mine in itself. Farther south on the "GrandCentral" claim andincline has been sunk about 100 feet. The ore here insofar as developed is entirely oxidized. While it looks like white quartz, the entire incline will average 15% lead, 30% zinc, 0.15 gold, and 1.5 ounces of silver. This "Head Center", "Grand Central" fissure looks very promising and can well develop into a good mine with its greater precious metal content.

On the same hill as the vein just described, but over the top and on the eastern slope at a distance of one half mile lie three claims known as the "Ironcap", "Ironton" and"Ionia". The formation here is entirely different. There are several big black areas of tremolite which show a lot of lead and zinc. The one on the "Iron Cap" covers an area of 200 by 600 feet on the surface and is partially developed by a tunnel some 200 feet below, and a smaller one higher up.

There is considerable tonnage, possible 25,000 tons of stuff developed here which will assay 15% lead and 18% zinc. There is also a big probable tonnage of low lead and high zinc. The zinc is a beautiful lemon yellow, transparent sphalerite, and makes a very high grade concentration. Values in precious metals are negligible.

In summary, the area described contains, without question, an extremely large tonnage of leaz-zinc ore. Transportation presents the greatest difficulty but it is believed that the possibility for tonnage is more than enough to justify solving this difficulty and that one of the greatest lead-zinc mines in the country can be developed.

ROBERT H. SAYRE, JR.
MINING ENGINEER
230 - 27 ROAD--CH 2-5611
GRAND JUNCTION, COLO.

April 7, 1965

Mr. Richard A. Young
American Zinc, Lead and Smelting Company
1515 Paul Brown Bldg.
St. Louis Missouri, 63101

Dear Mr. Young:

I wish to thank you for sending me a copy of your letter dated March 5, 1965 and addressed to Herb Reynolds of Continental Materials.

Subsequent to March 5th Continental sent you a draft of a proposed lease and option on the Athletic Properties. I looked over Continental's proposal and found it fairly complete, and, with one major exception, it appeared to be an agreement which would suit both your company and Continental. The major exception, and obviously the heart of the matter, was that the proposal did not mention the C. W. T. Mine zinc concentrates.

Now as I have told Mr. Howard I. Young and Mr. Howard L. Young I am determined to see that this promising Athletic property gets explored, developed and into operation. As a matter of fact, as I told you, I have severed my rather non-challenging connection with the AEC in order to be ready and available to devote full time to the Aravaipa-Athletic project.

I believe that my choice of, and approach to, Continental was a proper move, as Continental is a reputable company with sufficient capital to do the job. Furthermore Continental, as a result of a field trip and geological studies, is willing, as you know, to spend $25,000 by the end of 1965, and if that first phase is favorable, an additional $75,000 during 1966.

However, despite the initial progress which we have all made in interesting a strong investor, the deal appears to be hung on dead center. American Zinc, having previously agreed to pay 10% royalty toAthletic, appears to gain nothing by leasing the property at 10% royalty but has been willing to do so provided Continental will commit its C. W. T. zinc concentrates to American Zinc. Continental takes the stand that it is not yet in a position to commit its C. W. T. zinc concentrates to American Zinc and that the royalty schedule originally proposed by American Zinc would be an excessive burden on operations. As a consequence progress on the Athletic properties is at a standstill.

Despite this state of affairs I am sure that something can be worked out. Negotiations in this case are between two sophisticated, experienced mining companies.

Since it appears that Continental is unwilling or unable to commit the C. W. T. concentrates, it seems to me we must reconsider the royalty schedule. At 10% royalty American Zinc, which has committed about $70,000 to the properties, receives only the benefit of the Athletic zinc concentrates and the relief from the expense of watchmen and taxes. It seems to me that American Zinc should realize some return from any production which Continental may achieve.

In view of the fact that any royalty above 10% will be a burden on a small operation of this type the solution may be to limit this burden to as short a time as possible. I suggest that the negotiating parties consider the adoption of American Zinc's proposed royalty schedule (as amended below) <u>only until</u> Athletic is paid its $100,000. Thereafter the total royalty payable by Continental should be substantially reduced. Accordingly I suggest a royalty schedule as follows:

ROBERT H. SAYRE, JR.
MINING ENGINEER
230 - 27 ROAD--CH 2-5611
GRAND JUNCTION, COLO.

ROYALTY TO BE PAID BY CONTINENTAL:

UNTIL ATHLETIC RECEIVES $100,000:

Royalty	Zinc Price	Lead Price
12½%	Up to 12.499¢/lb.	Up to 13.999¢/lb.
15 %	12.5¢/lb. and up	14.0¢/lb. and up

(I recommend that the 20% royalty be omitted as excessively burdensome.)

AFTER ATHLETIC RECEIVES $100,000:

Royalty	Zinc Price	Lead Price
7½%	Up to 12.499¢/lb.	Up to 13.999¢/lb.
10 %	12.5¢/lb. and up	14.0¢/lb. and up

In the event that ore is found and mining operations yield 30,000 tons per year of ore averaging $20 net smelter value, the returns to the participants will be as follows:

At the end of 20 months:

Athletic will have received its $100,000.
American Zinc will have received $50,000.
(Assuming that zinc price remains at or above 12.5¢ and lead price at or above 14¢)

At the end of an additional 10 months:

American Zinc will have received all of its original $70,000 committed.

It seems to me that a royalty schedule along the lines above suggested would give the royalty holders a fair return and at the same time wouldallow Continental a reasonable climate for a successful mining operation.

It should be born in mind that by mid-1966 Continental may be in a position to decide on a market for its C. W. T. zinc concentrates. At that time exploration of the Athletic properties hopefully will have resulted in the discovery of ore. It is not unreasonable to expect that at that time the entire situation can be reviewed, and there is always the possibility that Continental could commit its C. W. T. concentrates to American Zinc.

I strongly recommend that the participants seriously consider insertion of a royalty schedule such as I have outlined. I have considerableconfidence in the potential of the Aravaipa-Athletic mining properties, and commencement of exploration must not be unreasonably delayed.

Sincerely yours,

Robert H. Sayre, Jr.

Robert H. Sayre, Jr.

Two copies to:
Mr. C. H. Reynolds, Gen'l. Mgr.
Continental Materials Corporation
P. O. Box 1550
Grand Junction, Colorado

ROBERT H. SAYRE, JR.
MINING ENGINEER
230 - 27 ROAD--CH 2-5611
GRAND JUNCTION, COLO.

January 11, 1965

Mr. William Hurd
Klondyke, Arizona

Dear Bill:

As scheduled now, certain geological and mining engineers representing Continental Exploration, Inc., a subsidiary of Continental Materials Corp., will be visiting the Aravaipa mining properties some time during the week of January 18-22, 1965. Mr. Calhoun of American Zinc, Lead and Smelting Co. has authorized me to contact you and advise you of the visit of these men.

The Continental engineers will want to make a brief inspection of the accessible underground workings at Grand Central and Iron Cap mines, the surface between the New Center and Iron Cap mines, and also the mill; an inspection very similar to the one made by Mr. E. E. Lewis and myself November 23, 1964.

It does not appear now that I shall be available to accompany the Continental engineers on this particular trip. However, I have every hope of being in a position to visit the properties before too long, and it will be a great pleasure to see you at that time. I want to belatedly thank you and Mrs. Hurd for your gracious hospitality on November 23d.

I strongly suggest that if you can get to a telephone on Jaunuray 17th or 18th that you call me <u>collect</u> here in Grand Junction, Colorado. The area code number is 303 and my residence phone is 242-5611. I am reasonably sure that by that time I can give you a more exact date for the arrival of the Continental engineers and probably also the individuals' names. If you need to call during business hours on January 18th, I can be reached at Area Code 303 and the number 242-8621, extension 226.

With best regards,

Robert H. Sayre, Jr.

cc to:
Mr. C. H. Reynolds, Gen'l. Mgr.
Continental Materials Corp.
820 South 9th Street
Grand Junction, Colorado

Copy sent to Tucson
1/16/65

Average Assay of Zinc Concentrate from Athletic Mill

	____	1956 composite
Zn	55.2%	53.0%
Pb	2.14	3.2
Cd	.21	.208
Cu	1.45	1.69
Fe	4.4	5.9
S	33.6	
As	.01	.05
Sb	Tr.	.008
CaO	.45	
MgO	.14	
Ag	.9	1.32

$50/V $8.76 Frt. - Sahourita-Machovic

$50/V $9.53 Frt. - Cork-Machovic

ROBERT H. SAYRE, JR.
MINING ENGINEER
250 - 27 ROAD--CH 2-5611
GRAND JUNCTION, COLO.

December 31, 1964

Continental Materials Corp.
820 South 9th St.
Grand Junction, Colorado

Attention: Mr. C. H. Reynolds

As a result of our conversation today I submit herewith two reports on the Arravaipa mining properties of American Zinc, Lead and Smelting Co. The 1952 Reinhart report covers the geology and general background, and the 1964 Harrison Schmitt report gives Schmitt's ideas for exploration of the Head Center-Iron Cap trend. I should like to summarize a few available facts and provide a brief background to assist in your preliminary consideration of the properties. I am reasonably sure that complete production and cost records can be obtained from American Zinc, if it appears that your company is interested in operating the properties.

During the active period of operation by Athletic Mining and Smelting Co., 1948-1957, three mines were operated:

Year	Head Center Tons mined	Iron Cap Tons mined	Grand Central Tons mined	Total Tons mined
1948	5,000	26,000		31,000
1949	5,100	11,600	2,245	18,945
1950	2,700	11,400	5,159	19,259
1951	6,400	20,400	2,360	29,160
1952	12,300	8,900		21,200
1953	16,100			16,100
1954	19,200			19,200
1955	18,100			18,100
1956	18,400			18,400
1957	9,400			9,400
Total	112,700	78,300	9,764	200,764
Approx. Zn	10.5%	7%	8%	
Approx. Pb	5.1%	3%	16%	
" Ag			2 oz/T.	
" Au			.03 oz/T.	
Mining cost	$5 to 11/T.	$4 to 5/T.	$8 to 14/T.	
Trucking "	$1.07 to 2.33/T	$1.19 to 3.79	$2.36 to 3.12	
Milling cost	$2.50 to 5/T. Ave. about $3.30/T.			

Ores of the Head Center and Iron Cap mines were milled in a 125 ton per day selective flotation mill 10 miles south of the mines at Klondyke. Recovery was poor, seldom reaching 80% on lead and 70% on zinc. Zinc concentrates were shipped to the zinc smelter of Athletic Mining and Smelting Co. at Ft. Smith, Arkansas. Lead concentrates and the crude ore from the Grand Central mine were shipped to S&R, El Paso.

During the illness of Athletic's manager, Harvey Horton, I operated the mines and mill from August 1950 to February 1951. Operations were profitable. However, during its 10 years on the properties Athletic accomplished virtually no exploration, and the properties remain essentially unexplored. Dr. Schmitt, in the accompanying report, dwells on the good potential in the area between the Head Center and Iron Cap mines, and I agree that this is the area of first priority. However, I consider the area of the so-called No. 1 Mine to be worthy also of further study leading to exploration by surface drilling or underground work.

The mines and mill have remained idle since Athletic Mining and Smelting Co. ceased operations in 1957. During a one day inspection November 23, 1964, I observed that:

1. The Head Center inclined shaft is caved at the portal and the shaft is full of water. The cave did not appear serious. I believe a 2 man crew could catch up the portal and pump out the workings in about three weeks or so at a cost of perhaps $5,000.
2. The Iron Cap workings, for the most part, are open.
3. The Grand Central main shaft is open, but the north winze is caving. Since there was no ore in the winze at time of shutdown, this caving is not a critical item.
4. In general the mine equipment appeared in poor shape. However, the hoist is still at the Head Center, and the portal timbering work and de-watering can, I believe, get started without major equipment expenditures.
5. The mill appears in relatively good shape. No doubt many small items will be found needing repair or replacement, but I feel reasonably sure that a month's work at a cost of perhaps $5,000 will have it running and abbe to turn out concentrate.

In all probability the de-watering of the Head Center shaft will not reveal any sizeable tonnage of developed ore. At least any operator entering into this project must realize that it may take several months to discover and develop sufficient ore to justify starting milling operations. It would not be advisable to start with only a few thousand dollars, hoping that unwatering the shaft and oiling up the mill will permit immediate concentrate production. At least $100,000 should be provided in order to press exploration and development to a point at which sufficient ore is developed to assure reasonably continuous operation.

American Zinc has offered me a lease on the following terms:

1. Lessee to start unwatering Head Center mine and reconditioning mill within 30 days of date of lease.
2. Lessee to start exploration by drifting, long-holing and/or surface drilling within 60 days of date of lease.
3. Lessee to have property in production within 90 days of date of lease. (I am sure this particular item is meant to be more reasonable than it sounds. The essence of the deal is that American Zinc wants zinc concentrates at the earliest reasonably possible date.)
4. Lessee to sell all zinc and lead concentrates to American Zinc.
5. Royalty to American Zinc on sliding scale:

Zinc Price ¢ per pound	Lead Price ¢ per pound	Royalty, %of Net Smelter Return
Below 12½¢	Below 14¢	12½%
12½ to 13½	14 to 15	15%
Above 13½	Above 15	20%

(here I believe this royalty schedule may be negotiable.)

American Zinc bought the property in 1962 from Athletic Mining and Smelting. There is a watchman at the mine and another watchman at the mill. Taxes are about $1300 per year.

American Zinc has diverse major operations in Washington, Wisconsin and the Tri-State district, and since the ore targets are relatively small and scattered at the Aravaipa, Arizona properties, the company has understandably hesitated to set up any sort of a company operation on the properties.

Assuming that agreement can be reached with American Zinc as to some reasonable wording regarding commencement of actual production, and assuming that agreement can be reached on taming down the above royalty schedule, this appears to me to be an ideal leasing opportunity for a strongly financed company.

Respectfully submitted,

Robert H. Sayre, Jr.

Robert H. Sayre, Jr.

Grand Junction, Colo.
December 31, 1964

No 3

Araviapa

P. 1.

A COMMENTARY ON THE ARAVIAPA MINING DISTRICT

The continuing search for minerals forces a combination of geology and geophysics to extend and locate new targets for exploration and to find new mineral reserves. An outstanding success of applying geology to extend a mineralized area under a series of gravel for a geophysical target area and the use of geophysics to locate the mineralization within the target area and subsequent development of major producing mine here in Arizona was the development of the Pima Mine near Tucson, Arizona. The Araviapa Mining District in Graham County, Arizona is an area of known mineral production and an area that has an excellent potential of additional mineral wealth. It is covered by flows of igneous rock that covers the better, olded host rock. This paper has been written to try and appraise the potential of the area for additional exploration.

The Araviapa Mining District is located in Graham County in Eastern Arizona. It is approximately forty-seven miles to a major highway - U.S. 60 - and a branch of the Southern Pacific railroad. The nearest town is Safford, Arizona about sixty-one miles distance.

The Araviapa District has a past record of production from 1870 to 1958. During this time there were two major periods of activity, 1923 to 1928 and 1944 to 1957. Total production, as given in U.S.G.S., Page 461, was 272,834 tons of ore.

Metal	Recovery	Content of Ore
Lead	32,268,725 lbs.	5.91%
Zinc	27,244,697 lbs.	4.99%
Copper	1,835,610 lbs.	0.33%
Silver	351,145 Ounces	1.28 oz./ton
Gold	3,506 Ounces	.013 oz./ton

Total dollar value - $8,355,870.

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Most of the production has come from one ore body in the Head Center Mine. This one mine has probably produced $5,000,000 of the $8,355,870. total.

The past production record, as well as recent samples, indicate that lead and zinc are the principle metals. The lack of precious metals, gold and silver, undoubtedly hindered exploration in the early days as much as the remote location.

Geology

The geology of the Araviapa District has been skillfully written in detail in Geological Survey Professional Paper 461 - Geology of the Klondyke Quadrangle Graham and Pinal Counties, Arizona, by Frank R. Simons. In consideration of locating a possible ore deposit in the Araviapa District, only a very brief description will be given of the geology as it relates to mineralization.

The rocks in the area range from the Pinal schist of Precambrian Age to recent volcanics. However the principle host rocks appear to be the sedimentary rocks - limestone and quartzite of Paleozoic times, particularly the Horquilla limestone of Pennsylvanian Age. It also appears that ore deposits are limited to rocks as old or older than the Horse Mountain volcanics which are considered Tertiary.

The ore deposits are mostly of the vein type, varying from less than 1 foot to 8 feet in the Sinn Fein, 15 feet in the Head Center, to 150 feet in the Grand Reef. Some production has come from replacement deposits in the limestone, and the limestone can be regarded as a potential host rock for a replacement deposits.

In addition to the showings of galena and sphalerite which are recorded in U.S.G.S., Page 461, there are good showings of cerussite and smithsonite in the limestone. These minerals are difficult to recognize in the limestone because they

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have the same color as the weathered limestone. When these showing of supergene minerals are explored, the hypogene minerals are readily found and recognized and appear 2 to 4 feet below the surface.

Figure 1 shows drilling on Mr. Bott's Brushy Basin No. 1 claim which exposed small veins of galena and sphalerite at a shallow depth.

Figure 2 shows the extent of alteration in the limestone and assays taken in the alteration zone. These assays indicate a grade ore in which the lead would be about the average for the district, but the zinc content considerable higher.

The faults in the area can be very easily seen and mapped. However the displacement of the faults is often impossible to determine by surface mapping. The vein structures in the igneous rocks are quite strong and easily followed. It is however difficult to predict the rock type as the veins dip under the surface. Because of the apparent close correlation between wall rock and mineralization, it would be helpful to be able to project rock type. It will be necessary to use indirect or subsurface methods to obtain this information.

The exposed veins and alternation zones provide focal points to start geological exploration and act as a guide to finding a commercial orebody.

Information not readily available from surface geology might be determined by geophysical exploration. Electrical methods could be used to outline the direction or trend of the mineralization in the limestone under the recent volcanic rocks. Seismic methods with the higher resolving power could determine the thickness of the limestone, the top of the limestone under the volcanics and the areal extent of the limestone. The limestone surface should provide a key

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horizon marker for geological mapping and thereby provide information extent and vertical displacement of faults.

Let us now consider certain facts about the Araviapa Mining District:

1. The area is readily accessible by a dirt road. It would be considered remote in regard to housing or railroad.

2. One ore body was developed into a profitable mining operation grossing more than five millon dollars.

3. There are excellent exposures of alternation zones, and mineralized zones to guide exploration.

4. Although there are excellent rock exposures in the area, the extent and throw of faults and ore control features ore difficult to determine without drilling or geophysical exploration.

5. The older rocks appear to be the better host rocks, and these are covered by volcanic rocks.

6. The limestone beds and perhaps the best host rock should have a sufficient contrast in seismic velocity to permit subsurface mapping and thereby permit a determination of subsurface.

Because of the distance to a rail head, transportation to smelter, and a lead-zinc ore that requires separation in order to derive payment for both metals, it will be necessary to concentrate the ore. Therefore to be of commercial value it will be necessary to establish a reserve of sufficient tonnage to justify capital expenditure for a concentrator as well as mining equipment.

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Since the area appears to have merit, and susceptible to various type of exploration, it becomes necessary to outline both a short and long range method of exploration to develop an ore reserve of sufficient size to justify the mining operation. Inasmuch as surface Shows and existing adits have indicated good mineralization, a target is in site. Perhaps the least expensive exploration which would establish an ore reserve and provide geological information as a guide to further work would be percussion long hole drilling, recovering the drill cuttings with a cyclone separator for geological information and assaying.

Percussion drilling to a depth of 100 feet can be contracted for at a about $1.50 per foot. A limited expenditure should therefore outline a small ore reserve near the surface within the range of open pit mining. Drilling below the 100 foot depth will require churn, rotary or diamond drilling. The best information can be obtained from diamond drilling, but the cost of drilling will be from $7.00 to $10.00 per foot. The diamond drill holes will probably projected to depth of 500 feet or more with a resulting cost of $5,000 or more per hole.

It would therefore seem advisable, before attempting diamond drilling, to obtain the best possible information to control the location and direction of the diamond drilling. An intensive geophysical survey of 3 to 4 square miles could be accomplished for less than the cost of two drill holes. The geophysical survey should have two phases. An electrical method probably induced polarization should indicate the location of mineralized areas which do not outcrop. The presence of the limestone should provide a key bed for seismic exploration of sufficient change in velocity to permit detailed geological mapping and accurately predict the depth for the control of drilling, and to outline the extent of the limestone. The possibility of a

replacement deposit within the limestone, such as occurs at the Christmas mine forty miles distance away, should be considered.

In conclusion, the Araviapa area does offer an excellent location for additional exploration, first by drilling the surface mineral exposures and by more extensive geological and geophysical work and deeper drilling.

[redacted]

Box 407
GLOBE.
ARIZONA 85501

CLELAND N. CONWELL
MINING ENGINEER

TELEPHONE: 602 · 425-5593

Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
CNC
CLELAND KEEPER
CONWELL
DEC. 31, 19 7
ARIZONA U.S.A.

Feb. 1967

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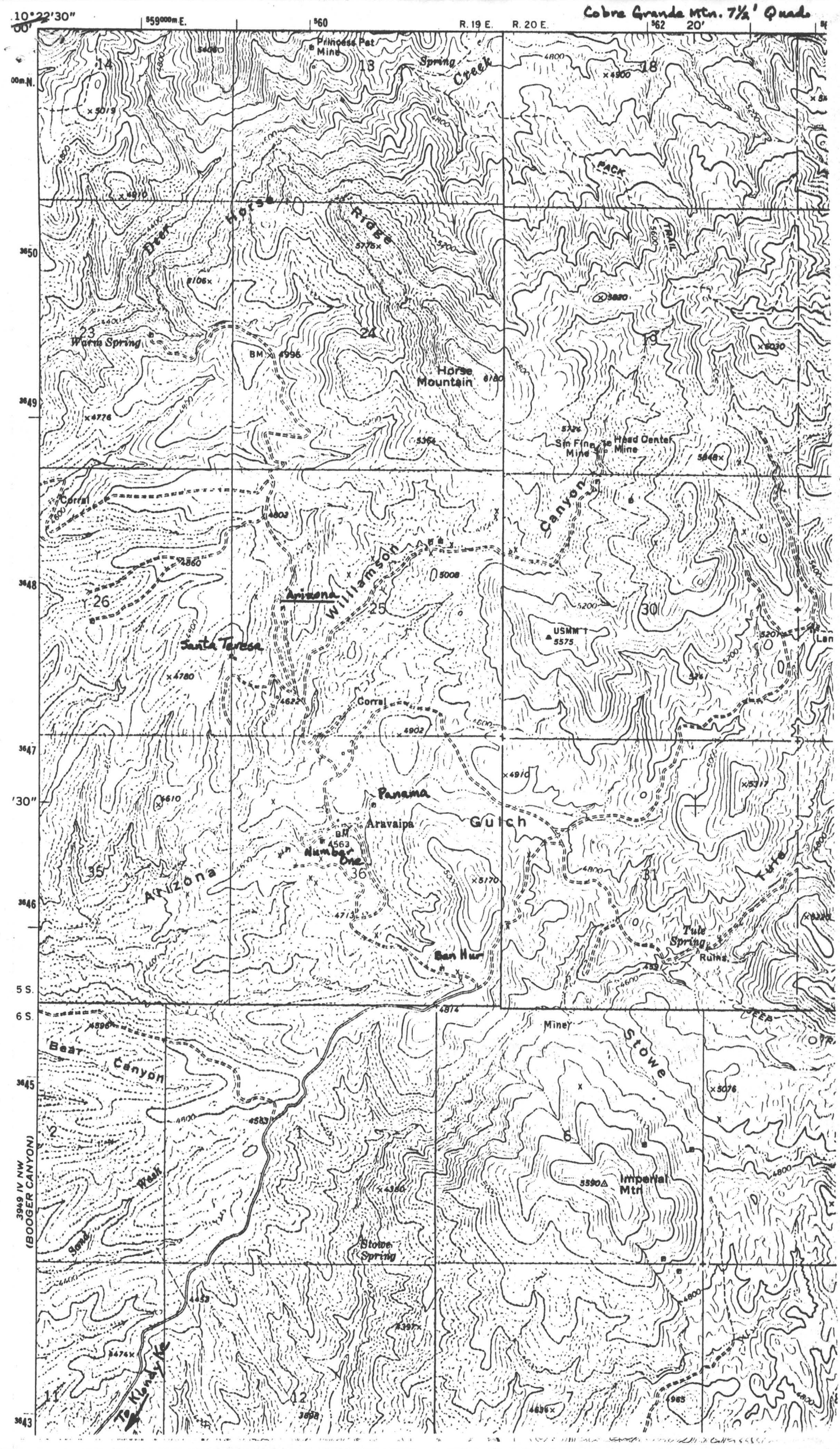
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Santa Teresa
USMM
Corral
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Gulch
Arizona
Number One
Ben Hur
Tule
Tule Spring
Ruins
JEEP
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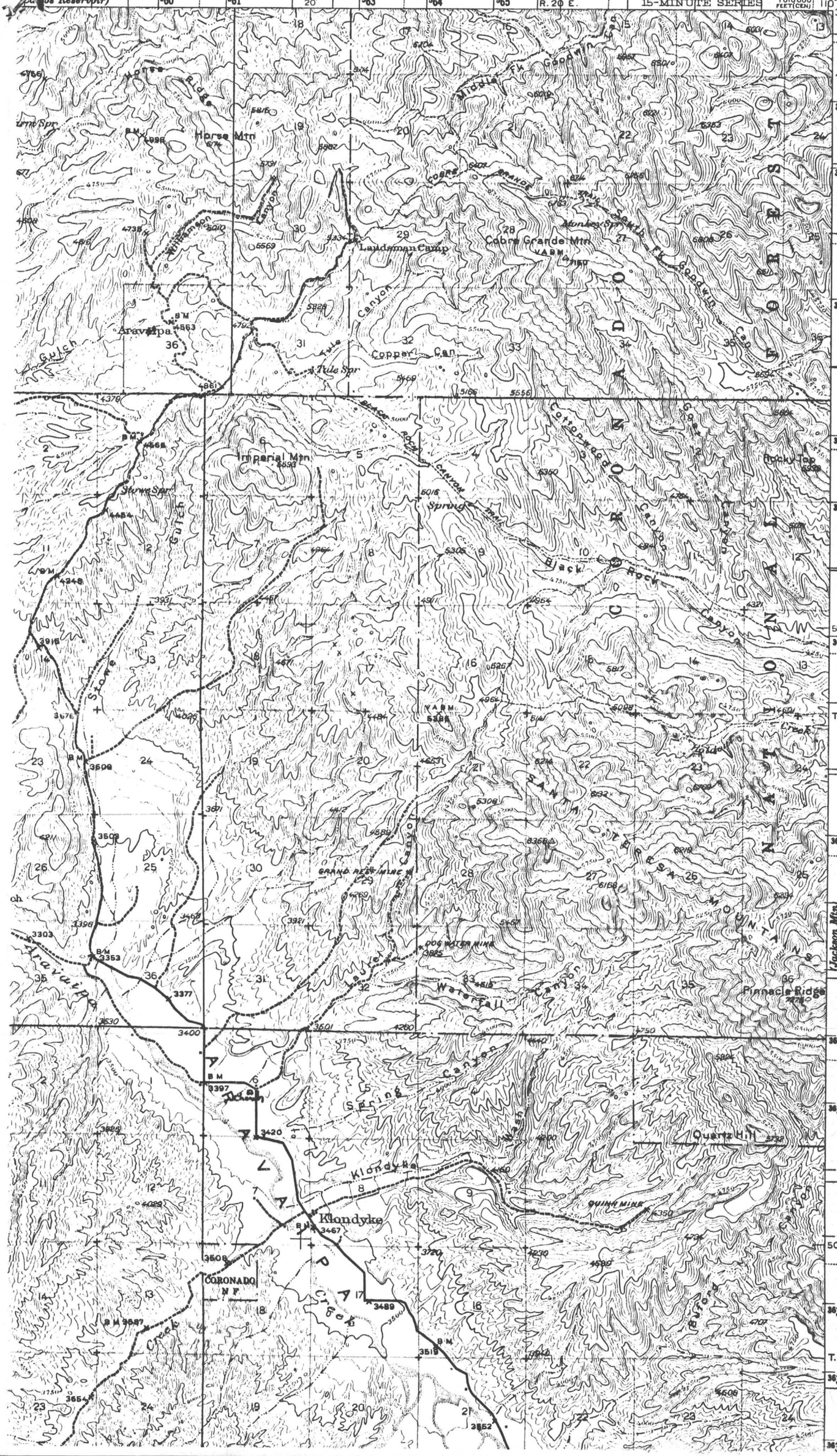
Bear Canyon
Sand Wash
Imperial Mtn
Stowe Spring
To Klondyke

ARIZONA
KLONDYKE QUADRANGLE
15-MINUTE SERIES



Caller inquired about mine files on the Head Center and Iron Cap mines of Graham county. He reported that the Claridge family owns 27 patented mining claims comprising the Head Center and Iron Cap properties. He mentioned WILFORD CLARIDGE, 513 1st, Thatcher, AZ., Phone 428-3342, as one of the owners. MG WR 10/16/81

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Office Secry. Safford, Mr. Ward Mill watchman and mine foreman Mr. Jim Malloy

   Address: ### 202 5th Ave. Safford

2. Mine: Iron Cap
3. No. of Claims - Patented reported 400 approx pat and unpat.
   Unpatented
4. Location: Arivaipi and Klondyke
5. Sec Tp Range
6. Mining District Arivaipi
7. Owner: FAR Mining Enterprises
8. Address: 202 fifth Safford
9. Operating Co.: Same
10. Address: Same
11. President: Fred A. Rebolt
12. Gen. Mgr.
13. Principal Metals:
14. No. Employed: 30
15. Mill, Type & Capacity: 175 TPD flotation
16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☑
    (d) Production ☒ (e) Rate ? tpd.
17. New Work Planned:

18. Miscl. Notes: New crushing plant installed at mill. Filters have been sent off for remodling. Ore now being stockpiled. Ore coming from open pit at the Iron Cap mine about one mile north of the Landsman Camp. The ore appears to be hi in iron and zinc with some lead showing. Appears to be sulfides in lime gangue. ~~roads to plant have been widened. Mining is proceeding using an air track, with~~ a large compressor. A 2 or 3 yard rubbertired loader loads out a 20 ton diesel dump truck using a Davis retarder.

Date: ###### 2-6-69

(Signature) (Field Engineer)

Graham Co.

HEAD CENTER & IRON CAP MINES District: Aravaipa P.O. Box 792, Safford

Owner & Operator: Athletic Mining Co., Safford

Mgr: Harvie L. Horton

Ore: LEAD-ZINC-COPPER-GOLD-SILVER

Located 12 miles northwest of Klondyke, Arizona. Developed by shaft and tunnel. Using purchased electric REA power at 150 ton capacity - flotation mill and diesel power at mine. Regular mining equipment. Ship by truck to Cork Siding on Southern Pacific Railroad. Employ 30 men.

LOS ANGELES CHAMBER OF COMMERCE

FOREWORD

This eleventh survey of Arizona and Southwestern New Mexico mines was completed in March 1956, by the Mining Section of the Industrial Department.

1955 was a banner year for the copper mining industry, copper prices reaching the highest peak since 1865.

Arizona again ranked first in copper production in the United States, as it has done since 1910, last year's output being the highest in the State's history.

The total value of New Mexico's mineral production also reached a new record high in 1955.

The Mining Section is at the service of both producers and consumers of mineral products, as well as the sellers of mining equipment in locating markets and establishing sources of raw material supplies.

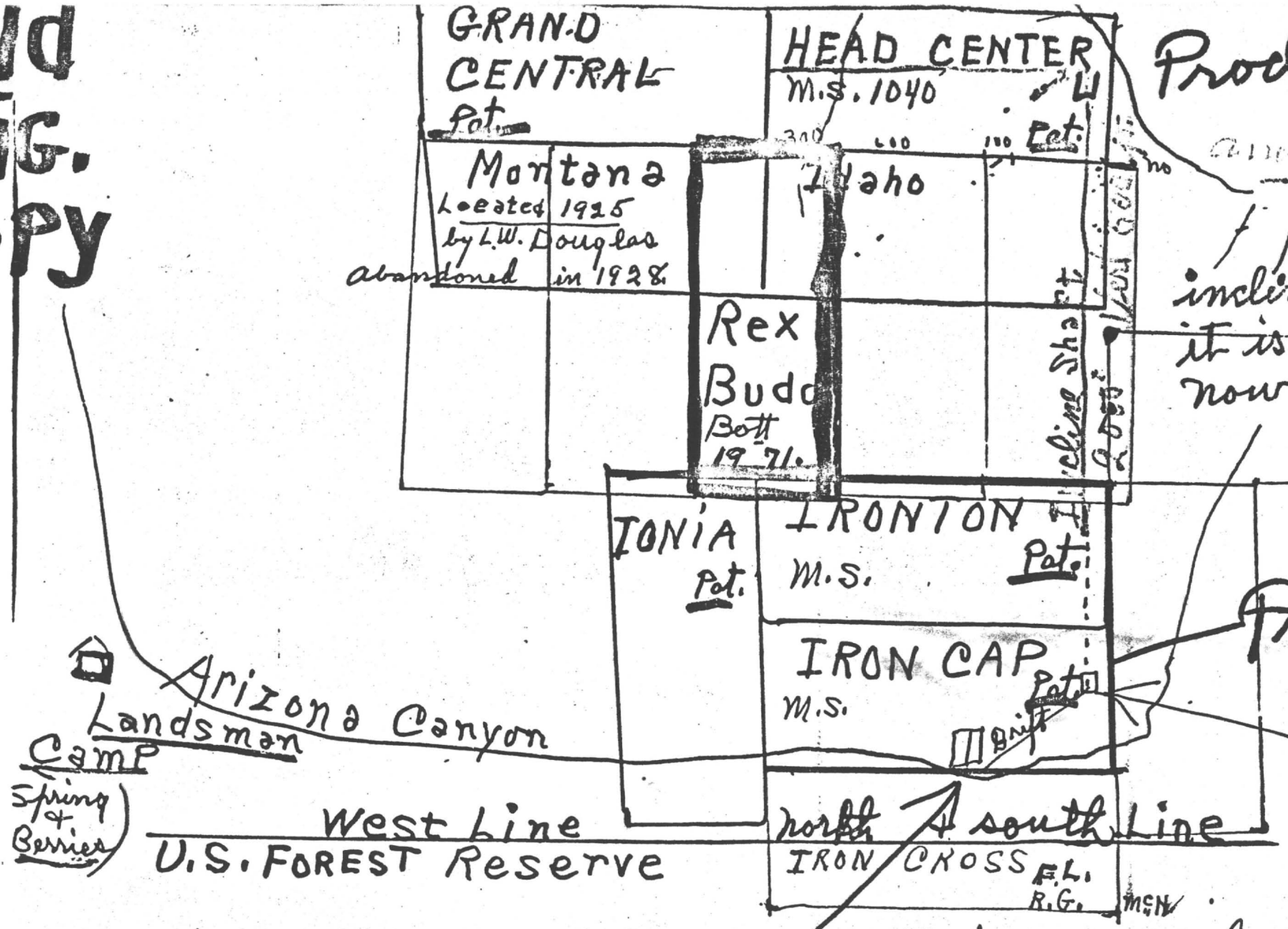
Respectfully submitted,

Edward Arthur

Edward Arthur
Mining Commissioner

Mining Section
Industrial Department

Hold Orig. Copy



Prod. $5,000,000.
Lead, zinc, silver and gold.

Head Cent Shaft is incline 2000 ft. Vertically it is 500 ft down and now under the Ironton Claim.

Prod. $1,500,000.
Lead + zinc.

Dr. H.A. Schmitt a very good Consulting Geol. wanted to raise on the to the surface. He got $50.00 per hour for his work. G.H. Bott

Met L.W. Douglas + wife Peggy here 47 yrs ago, in 1927. (mine car had overshot the orebins & landed in Ariz. Canyon.
G.H. Bott.

Brushy. or Bott